A new general purpose parallel database system

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18-20 Dec. 1997
1997
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Number of Pages: xiii+503
References Cited: 13
INSPEC Accession Number: 5816459

Abstract:
This paper is concerned with the transparent parallelisation of declarative data queries, based on theoretical principles. We have designed an entire database architecture suitable for use on any general-purpose parallel machine. This ar addresses the shortcomings in flexibility and scalability of commercial parallel A substantial benefit is that the mathematical principles underlying our framew provably correct parallel evaluations and optimisations, using compile-time transformations. We address parallelism in a language-independent way throu choice of monoids as a formulation for expressing and modelling queries. Que expressed in our declarative language are transformed into applications of a higher-order function, the monoid homomorphism. The evaluation of this func partitioned at run-time, giving a tree-like processor topology, the depth and b which can be varied with a declarative execution plan. Leaf nodes within the e tree operate on their own data partitions and forward results to the appropriat nodes. Due to the nature of our language, the functions that are necessary to results from independent parallel evaluations are generated automatically at compile-time from a monoid definition dictionary, additions to which can be m extend the system's data types. We have built a complete prototype of our sys which uses Swiss Radio Corporation's entire recorded music catalogue, on a general-purpose Ar1000, 128-cell parallel computer at the IFPC.

Index Terms:
parallel machines; parallel database system; transparent parallelisation; decla database queries; database architecture; parallel machine; compile-time transformations; tree-like processor topology; database queries

A parallel virtual machine for programs composed of ab: data types

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On page(s): 1249 - 1261
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Volume: 43 Issue: 11
ISSN: 0018-9340
References Cited: 48
CODEN: ITCOB4
INSPEC Accession Number: 4792169

Abstract:
An abstract data type mechanism is provided by many modern programming l and is often employed during system development to promote modularity and This paper describes ARC, a parallel virtual machine designed for executing pr that use abstract data types (ADTs). The major contribution of ARC is that it s Asynchronous Remote Procedure Call (ARPC), a model of parallel execution th well for programs developed by layering ADTs. To support ARPC, ARC perform synchronization, automatic parameter restoration, and dynamic load balancing

Index Terms:
software reusability; virtual machines; parallel programming; abstract data ty structures; database management systems; multiprocessing programs; remot procedure calls; parallel virtual machine; abstract data types; programming la system development; modularity; reuse; ARC; ADTs; Asynchronous Remote P Call; data synchronization; automatic parameter restoration; dynamic load ba

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Search Results -

Terms	Documents
l2 and (object near5 orient$3)	3

Database: US Patents Full-Text Database; JPO Abstracts Database; EPO Abstracts Database; Derwent World Patents Index; IBM Technical Disclosure Bulletins

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Search History

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DB Name	Query	Hit Count	Set Name
USPT,JPAB,EPAB,DWPI,TDBD	l2 and (object near5 orient$3)	3	L9
USPT,JPAB,EPAB,DWPI,TDBD	l2 and (data type$1)	0	L8
USPT,JPAB,EPAB,DWPI,TDBD	abstract same (data type$1)	0	L7
USPT,JPAB,EPAB,DWPI,TDBD	l5 and (data near5 type$1)	0	L6
USPT,JPAB,EPAB,DWPI,TDBD	l4 and attribut$1	1	L5
USPT,JPAB,EPAB,DWPI,TDBD	l3 and memory and pointer$1 and object$1	6	L4
USPT,JPAB,EPAB,DWPI,TDBD	l2 and (query$3 or search$3)	73	L3
USPT,JPAB,EPAB,DWPI,TDBD	(parallel and database$1).ti.	150	L2
USPT,JPAB,EPAB,DWPI,TDBD	abstract data types	0	L1

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Search Results - Record(s) 1 through 3 of 3 returned.

☐ 1. Document ID: US 5857180 A

L9: Entry 1 of 3 File: USPT Jan 5, 1999

US-PAT-NO: 5857180
DOCUMENT-IDENTIFIER: US 5857180 A
TITLE: Method and apparatus for implementing parallel operations in a database management system

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

☐ 2. Document ID: US 5754841 A

L9: Entry 2 of 3 File: USPT May 19, 1998

US-PAT-NO: 5754841
DOCUMENT-IDENTIFIER: US 5754841 A
TITLE: Method and apparatus for parallel execution of user-defined functions in an object-relational database management system

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

3. Document ID: KR 98048464 A

L9: Entry 3 of 3 File: DWPI Sep 15, 1998

DERWENT-ACC-NO: 1999-491139
DERWENT-WEEK: 199941

TITLE: Processing method for high-speed parallel query of an object-oriented temporal database - NoAbstract

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Terms	Documents
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☐ 1. Document ID: US 5857180 A

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US-PAT-NO: 5857180
DOCUMENT-IDENTIFIER: US 5857180 A
TITLE: Method and apparatus for implementing parallel operations in a database management system

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWMC | Draw Desc | Image

☐ 2. Document ID: US 5832484 A

L4: Entry 2 of 6 File: USPT Nov 3, 1998

US-PAT-NO: 5832484
DOCUMENT-IDENTIFIER: US 5832484 A
TITLE: Database system with methods for parallel lock management

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWMC | Draw Desc | Image

☐ 3. Document ID: US 5819083 A

L4: Entry 3 of 6 File: USPT Oct 6, 1998

US-PAT-NO: 5819083
DOCUMENT-IDENTIFIER: US 5819083 A
TITLE: Minimal sufficient buffer space for data redistribution in a parallel database system

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWMC | Draw Desc | Image

☐ 4. Document ID: US 5687369 A

L4: Entry 4 of 6 File: USPT Nov 11, 1997

US-PAT-NO: 5687369
DOCUMENT-IDENTIFIER: US 5687369 A
TITLE: Selecting buckets for redistributing data between nodes in a parallel database in the incremental mode

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWMC | Draw Desc | Image

☐ 5. Document ID: US 5634125 A

L4: Entry 5 of 6 File: USPT May 27, 1997

US-PAT-NO: 5634125
DOCUMENT-IDENTIFIER: US 5634125 A
TITLE: Selecting buckets for redistributing data between nodes in a parallel database in the quiescent mode

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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☐ 6. Document ID: US 4769772 A

L4: Entry 6 of 6 File: USPT Sep 6, 1988

US-PAT-NO: 4769772
DOCUMENT-IDENTIFIER: US 4769772 A
TITLE: Automated query optimization method using both global and parallel local optimizations for materialization access planning for distributed databases

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

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Terms	Documents
l3 and memory and pointer$1 and object$1	6

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Wuytack, S.; da Silva, J.L.; Catthoor, F.; de Jong, G.; Ykman-Couvreur, C.
Computer-Aided Design of Integrated Circuits and Systems, IEEE Transactio
Volume: 18 Issue: 5 , May 1999
Page(s): 533 -544

[Abstract] [HTML Full-text] [PDF Full-Text] **JNL**

2 **Reconfigurable software development**
Clark, B.K.
Digital Avionics Systems Conference, 1991. Proceedings., IEEE/AIAA 10th , 1
Page(s): 499 -503

[Abstract] [PDF Full-Text] **CNF**

3 **Engineering embedded knowledge-based software for a digital swi system**
Bouteldja, M.
Software Engineering for Telecommunication Switching Systems, 1989. SET Seventh International Conference on , 1989
Page(s): 142 -146

[Abstract] [PDF Full-Text] **CNF**

4 **Semantic and object-oriented database support for software enviro**
King, R.
Computer Software and Applications Conference, 1988. COMPSAC 88. Proce Twelfth International , 1988
Page(s): 441 -442

[Abstract] [PDF Full-Text] **CNF**

5 **Some practical considerations regarding an ADT-obsessed design**
Naphtali, E.; Rich, M.
Software Engineering Journal , Volume: 3 Issue: 2 , March 1988
Page(s): 57 -63

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1 **Separating application functionality from the user interface in a dis environment**
Dlodlo, N.; Bamford, C.
EUROMICRO 96. Beyond 2000: Hardware and Software Design Strategies., Proceedings of the 22nd EUROMICRO Conference , 1995
Page(s): 248 -255

[Abstract] [PDF Full-Text] **CNF**

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1 **OLAP query processing for partitioned data warehouses**
Bellatreche, L.; Karlapalem, K.; Mohania, M.
Database Applications in Non-Traditional Environments, 1999. (DANTE '99). Proceedings. 1999 International Symposium on , 2000
Page(s): 35 -42

[Abstract] [PDF Full-Text] **CNF**

2 **The visual query language for an object-oriented knowledge-based**
Ming Xu; Yong-Jun Wang; Yi-Jie Wang; Kang Zhang; Yanchun Zhang
Database Applications in Non-Traditional Environments, 1999. (DANTE '99). Proceedings. 1999 International Symposium on , 2000
Page(s): 407 -410

[Abstract] [PDF Full-Text] **CNF**

3 **Effect of failures on optimal location management algorithms**
Krishnamurthi, G.; Somani, A.K.
Fault-Tolerant Computing, 1999. Digest of Papers. Twenty-Ninth Annual Inte Symposium on , 1999
Page(s): 110 -117

[Abstract] [PDF Full-Text] **CNF**

4 **Exploiting data lineage for parallel optimization in extensible DBMS**
Shek, E.C.; Muntz, R.R.
Data Engineering, 1999. Proceedings., 15th International Conference on , 19
Page(s): 256
[Abstract] [PDF Full-Text] **CNF**

5 **Run-time detection in parallel and distributed systems: application safety-critical systems**
Plale, B.; Schwan, K.
Distributed Computing Systems, 1999. Proceedings. 19th IEEE International Conference on , 1999

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1 **Parallelizing user-defined functions in distributed object-relational**
Ng, K.W.; Muntz, R.R.
Database Engineering and Applications, 1999. IDEAS '99. International Sym Proceedings , 1999
Page(s): 442 -450

[Abstract] [PDF Full-Text] **CNF**

2 **Proceedings. SCCC'99 XIX International Conference of the Chilean Computer Science Society**
Computer Science Society, 1999. Proceedings. SCCC '99. XIX International C of the Chilean , 1999
[Abstract] [PDF Full-Text] **CNF**

3 **Interdatabase existence dependencies: a metaclass approach**
Castellanos, M.; Kudrass, T.; Saltor, F.; Garcia-Solaco, M.
Parallel and Distributed Information Systems, 1994., Proceedings of the Thir International Conference on , 1994
Page(s): 213 -216

[Abstract] [PDF Full-Text] **CNF**

4 **A parallel virtual machine for programs composed of abstract data**
Welch, L.R.
Computers, IEEE Transactions on , Volume: 43 Issue: 11 , Nov. 1994
Page(s): 1249 -1261

[Abstract] [PDF Full-Text] **JNL**

5 **An architecture for a scientific visualization system**
Lucas, B.; Abram, G.D.; Collins, N.S.; Epstein, D.A.; Gresh, D.L.; McAuliffe,
Visualization, 1992. Visualization '92, Proceedings., IEEE Conference on , 19
Page(s): 107 -114

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Terms	Documents
l29 and ((707/$)!.CCLS.)	0

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USPT,JPAB,EPAB,DWPI,TDBD	129 and (memory near5 address$2)	0	L32
USPT,JPAB,EPAB,DWPI,TDBD	129 and query$3	0	L31
USPT,JPAB,EPAB,DWPI,TDBD	(data near5 type$1 and memory and query$3).ti.	0	L30
USPT,JPAB,EPAB,DWPI,TDBD	(data near5 type$1 and memory).ti.	639	L29
USPT,JPAB,EPAB,DWPI,TDBD	126 and (data and item$1)	0	L28
USPT,JPAB,EPAB,DWPI,TDBD	126 and (data same item$1)	0	L27
USPT,JPAB,EPAB,DWPI,TDBD	124 and pointer$1	2	L26
USPT,JPAB,EPAB,DWPI,TDBD	124 and cluster$3	0	L25
USPT,JPAB,EPAB,DWPI,TDBD	123 and index$3	2	L24
USPT,JPAB,EPAB,DWPI,TDBD	122 and (memory same address$3)	4	L23
USPT,JPAB,EPAB,DWPI,TDBD	(query$3 and parallel).ti.	33	L22
USPT,JPAB,EPAB,DWPI,TDBD	120 and query$3 and parallel	0	L21
USPT,JPAB,EPAB,DWPI,TDBD	118 and pointer$1	33	L20
USPT,JPAB,EPAB,DWPI,TDBD	118 and cluster$3	0	L19
USPT,JPAB,EPAB,DWPI,TDBD	(data structure$1 and memory).ti.	141	L18
USPT,JPAB,EPAB,DWPI,TDBD	116 and cluster$3	0	L17
USPT,JPAB,EPAB,DWPI,TDBD	(memory and pointer$1 and query$3).ti.	1	L16
USPT,JPAB,EPAB,DWPI,TDBD	(memory and pointer$1 and address and query).ti.	0	L15
USPT,JPAB,EPAB,DWPI,TDBD	112 and pointer$1	0	L14
USPT,JPAB,EPAB,DWPI,TDBD	112 and identifier$1	0	L13
USPT,JPAB,EPAB,DWPI,TDBD	110 and index$3	1	L12
USPT,JPAB,EPAB,DWPI,TDBD	110 and cluster$3	0	L11
USPT,JPAB,EPAB,DWPI,TDBD	19 and (memory near5 address$3)	7	L10
USPT,JPAB,EPAB,DWPI,TDBD	(query$3 and memory).ti.	47	L9
USPT,JPAB,EPAB,DWPI,TDBD	17 and identifier$1	0	L8
USPT,JPAB,EPAB,DWPI,TDBD	16 and server$1	1	L7
USPT,JPAB,EPAB,DWPI,TDBD	15 and query$3	1	L6
USPT,JPAB,EPAB,DWPI,TDBD	14 and address$3	1	L5
USPT,JPAB,EPAB,DWPI,TDBD	cluster$3 and 13	1	L4
USPT,JPAB,EPAB,DWPI,TDBD	12 and index$3	5	L3
USPT,JPAB,EPAB,DWPI,TDBD	11 and (dictionary)	15	L2
USPT,JPAB,EPAB,DWPI,TDBD	(database and memory).ti.	592	L1